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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/579,250	05/12/2006	Hee-Joo Jeon	NEK-0031	7111
23413 7590 04/01/2008 CANTOR COLBURN, LLP 20 Church Street 22nd Floor Hartford, CT 06103				
EXAMINER				
CHEUNG, WILLIAM K				
ART UNIT		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/579,250

Applicant(s)

JEON ET AL.

Examiner

WILLIAM K. CHEUNG

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG/US)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. The examiner acknowledges the receipt of the amendment filed December 20, 2007. Claims 1-26 are pending.
2. In view of the amendment filed December 20, 2007, the objection of claim 8 is withdrawn. Regarding claim 18 (line 6), the recitation "25" seems to be a typographical error that is not supported in the original set of claims, nor there is any indication that "25" has been added, please have typographical error corrected.
3. In view of the amendment filed December 20, 2007, the rejection of Claims 9, 11-18, 20-26 under 35 U.S.C. 103(a) as being unpatentable over Tachibana et al. (US 4,035,563) as evident by Gloesener et al. (US 5,214,092), is withdrawn.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tachibana et al. (US 4,035,563) as evident by Gloesener et al. (US 5,214,092) in view of the product literature of Fujian Sannong Calcium Carbonate Co., on Nano calcium carbonate (1993) for the reasons adequately set forth from paragraph 6 of the office action of September 21, 2007.

1. (Currently Amended) A nano calcium carbonate/vinyl chloride monomer dispersion comprising:
a vinyl chloride monomer;
nano calcium carbonate; and
a lipophilic dispersing agent, which comprises 1-30 parts by weight of nano calcium carbonate per 100 parts by weight of the vinyl chloride monomer, <u>the nano calcium carbonate being modified with a metal salt of an organic acid.</u>

Tachibana et al. (col. 5, line 15-47) disclose a process for preparing a dispersion composition comprising adding a water soluble metallic salt, which include calcium carbonate as a water soluble metallic salt. Although Tachibana et al. disclose that

amount of calcium carbonate used is 100 ppm to water, when the such concentration of calcium carbonate solution is added to the vinyl chloride monomers with other ingredients such as methanol, initiator (col. 1, line 12) and suspension stabilizer (col. 1, line 12), which would lower the solubility characteristics of calcium carbonate in water, causing the calcium carbonate to precipitate. As evident in Gloesener et al. (col. 2, line 67 to col. 3, line 2), the precipitation of calcium carbonate is an easy method for making nano-size particles of calcium carbonate. In view of the evidence of Gloesener et al., the examiner has a reasonable basis to believe that the process of Tachibana et al. also involve the precipitation of the calcium carbonate while preparing a mixtures comprising vinyl chloride monomers in the presence of lipophilic dispersing agents. Since the PTO does not have proper means to conduct experiments, the burden of proof is now shifted to applicants to show otherwise. In re Best, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977); In re Fitzgerald, 205 USPQ 594 (CCPA 1980).

Regarding the claimed lipophilic dispersion agents, Tachibana et al. (col. 1, line 12) clearly disclose the use of suspension stabilizer as well as initiator. Tachibana et al. (col. 8, claim 5) disclose the use of partially saponified polyvinyl alcohol (or polyvinyl acetate), cellulose, gelatin, and tricalcium phosphate.

The difference between the invention of claims 1-8 and Tachibana et al. is that Tachibana et al. are silent on a composition comprising 1-30 parts by weight of nano calcium carbonate per 100 parts by weight of vinyl chloride monomer.

However, the product literature of Fujian Sannong Calcium Carbonate Co., on Nano calcium carbonate (1993) teaches that nano calcium carbonates are suitable as

filler for polyvinyl chloride polymers. Therefore, motivated by the expectation of success of obtaining a polyvinyl chloride filled with nano calcium carbonate for PVC cable applications, which are products formed by extrusion processes, it would have been obvious to one of ordinary skill in art to incorporate the filler teachings and the extrusion teachings of the product literature of Fujian Sannong Calcium Carbonate Co., into Tachibana et al. to obtain the invention of claims 1-8.

Regarding the product by process feature "nano calcium carbonate being modified with a metal salt of an organic acid", applicants must recognize that "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Response to Arguments

6. Applicant's arguments filed December 20, 2007 have been fully considered but they are not persuasive. Applicants argue that the amended claims should be allowable because the amended claims require the nano calcium carbonate being modified with a metal salt of an organic acid. However, applicants fail to recognize that the newly introduced feature is related to the process for making the claimed nano calcium. Since the claimed invention of claims 1-8 is a product, the product by process features carry

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very little weight in the patentability of the claimed product. Applicants must recognize that "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Regarding applicants' argument that the modification of the nano calcium carbonate by a metal salt of an organic acid would change surface properties of the nano calcium carbonate particles in order to wet the vinyl chloride monomer, applicants fail to submit any comparative data on the products to show the criticality of the claimed process feature by showing the difference between the nano calcium carbonate particles with and without the modification with a metal salt of an organic acid. Applicants must recognize that comparative data are required because the claimed processing feature does not necessarily alter the surface properties of the nano calcium carbonate particles to an extent to have a difference between the nano calcium carbonate particles claimed and as disclosed in Fujian Sannong Calcium Carbonate Co. Applicants must recognize that the commercially available nano calcium carbonate particles can also be hydrophobic. Therefore, the 103 rejection set forth is maintained.

7. Claims 1-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tachibana et al. (US 4,035,563) as evident by Gloesener et al. (US 5,214,092) in view

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of the product literature of Fujian Sannong Calcium Carbonate Co., on Nano calcium carbonate (1993), further in view of Mathur et al. (US 4,980,395) as evident by Detterman (US 5,912,277).

9. (Currently amended) A method for preparing a PVC based nanocomposite resin composition comprising the steps of:

(a) adding nano calcium carbonate modified with a metal salt of an organic acid and a lipophilic dispersing agent to a vinyl chloride monomer to disperse them;

(b) adding the resultant mixture system to an aqueous solution system comprising deionized water, a suspension stabilizer and a polymerization initiator to prepare a suspension system and polymerizing the suspension system at an elevated temperature to prepare a PVC based nanocomposite resin composition; and

(c) processing the PVC based nanocomposite resin composition including an impact modifier to produce extruded articles.

18. (Currently amended) A method for preparing a PVC based nanocomposite resin composition comprising the steps of:

(a) adding nano calcium carbonate modified with a metal salt of an organic acid, a lipophilic dispersing agent and a polymerization initiator to a vinyl chloride monomer to disperse them;

(b) adding the resultant mixture system to an aqueous 25 solution system comprising deionized water and a suspension stabilizer to prepare a suspension system and performing polymerization at an elevated temperature to prepare a PVC based nanocomposite resin composition; and

(c) processing the PVC based nanocomposite resin composition including an impact modifier to produce extruded articles.

In view of paragraph 4 of instant office action, the invention of claims 1-26 is very similar to the process for making the PVC composition as taught in Tachibana et al.

The difference between the invention of claims 10, 19 and Tachibana et al. is that Tachibana et al. do not teach a PVC composition that has been toughened with MBS.

Mathur et al. (col. 7, line 19, KM-680) disclose that impact modifiers for improving the impact properties of the PVC composition are MBS based polymers. As evident by Detterman (col. 8, line 15-31), KM-680 is a MBS based impact modifier. Therefore, motivated by the expectation of success of obtaining a PVC/calcium carbonate nano-particles composition with improved impact properties, it would have been obvious to one of ordinary skill in art to incorporate the MBS teachings of Mathur et al. into Tachibana et al. to obtain the MBS features of claims 10, 19.

Further, the difference between the invention of claims 1-26 and Tachibana et al. is that Tachibana et al. do not teach calcium carbonate particles that have been modified with a metal salt of an organic acid.

Mathur et al. (abstract) disclose a PVC composition comprising modifying the PVC resins to improve impact strength. Mathur et al. (col. 7, line 23-24) disclose that the PVC compositions comprises calcium carbonate particles that have been surface modified with sodium stearate, a metal salt of an organic acid. Motivated by the expectation of success of obtaining a PVC/calcium carbonate composition with improved impact properties (col. 3, line 49-57), it would have been obvious to one of ordinary skill in art to incorporate the sodium stearate modified calcium carbonate

particle teachings of Mathur et al. into Tachibana et al. to obtain the invention of claims 1-26.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William K. Cheung whose telephone number is (571) 272-1097. The examiner can normally be reached on Monday-Friday 9:00AM to 2:00PM; 4:00PM to 8:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David WU can be reached on (571) 272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/William K Cheung/
Primary Examiner, Art Unit 1796

William K. Cheung, Ph. D.

Primary Examiner

March 24, 2008